

**REVIEW DRAFT**

*I-5 Columbia River Crossing Partnership:  
Traffic and Tolling Analysis*

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Existing Information Data Review  
for Screening Alternatives and  
Tolling Options

Working Paper 2.6

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## OVERVIEW

At the end of the I-5 Transportation and Trade Partnership project, the Final Strategic Plan provided findings and recommendations for multi-modal options aimed at solving the corridor's future transportation needs. In shaping the recommendations, extensive data collection and analyses was performed and design concepts were developed sufficiently to test the feasibility of four alignment options. The purpose of Working Paper 2.6 is to assess the adequacy of the available information for recommending a range of options to be used for the tolling analysis and to determine additional work required for narrowing of alternatives. Specifically, this paper addresses:

- A review of the traffic analysis prepared for the I-5 Trade Partnership to determine whether travel forecasts and results are sufficiently reliable and detailed to screen tolling options and evaluate and screen road/bridge improvement alternatives. And, if new or revised forecasts are proposed, an explanation of their impacts to the affected agencies and project schedule.
- An evaluation and recommendation of options to be used for the tolling analysis based on design factors likely to affect tolling options.
- A review of the engineering concepts to determine whether additional traffic analysis or engineering work is needed, within the current schedule, to advance narrowing of alternatives.
- An evaluation of existing information from the agencies on the I-205 river crossing which was not included in the previous stage of the I-5 Trade Partnership for the purpose of identifying additional data required to identify improvement requirements.

## ADEQUACY OF AVAILABLE TRAFFIC DATA FOR TOLLING ANALYSIS

Significant traffic data was generated and analyzed in the previous two phases of the I-5 Partnership projects. Updated data and new analysis is also available from the current I-5 Delta Park project in Oregon. Working Paper 4.2, "Listing of Available and Needed Traffic Data" and Technical Memorandum 4.3, "Travel and Traffic Characteristics and Trends" documented travel forecasts and results from these I-5 efforts. Tables 1, 2, and 3 in Working Paper 4.2 (replicated as Tables 4, 5, and 6 in Technical Memorandum 4.3) presented available as well as additional travel forecast information necessary to identify, evaluate and screen tolling options and road/bridge improvement options in this current phase of study.

### No New or Revised Travel Forecasts Are Proposed

No new or revised travel forecasts are proposed. Analysis will rely upon year 2000 and 2020 I-5 Trade Corridor Partnership forecasts. However, data not previously "mined" from these forecasts will be extracted by Metro for use in this study. Metro has committed to providing the following data from previous year 2000 and 2020 travel forecasts: peak period traffic volumes, highway capacity inputs, bridge select-link data by trip purpose, speed output, transit ridership, and household and employment data.

In addition, Metro and RTC, in conjunction with other regional partners, have formed a committee to assess the potential population and employment changes that could occur by year 2025 using the Metroscope land use allocation model. The committee will review Metroscope's assumptions and results, with a particular emphasis on potential effects to vehicular travel across the Columbia River bridges. The information from the Metroscope model will be used for informational purposes only. At this stage, the evaluation of tolling and road/bridge improvement options will be based on I-5 Trade Corridor Partnership forecasts.

## **WHAT OPTIONS SHOULD BE USED FOR THE TOLLING ANALYSIS?**

Tolling objectives for this study includes estimating revenue generation, evaluating traffic impacts, and determining costs of the identified tolling scenarios. Design concepts (or options) selected for tolling evaluation should represent the range of alternatives that will be studied in an EIS. The options selected for evaluation should meet the following criteria:

- Tolling options should have the potential to maximize revenues and recover capital, maintenance, and operational costs of the new facilities—within the framework of potential state and regional policies.
- The range of tolling options should be sufficient to cover the possible alternatives that will be evaluated in an Environmental Impact Study, and should consider the findings and recommendations from the Final Strategic Plan, June 2002, for the I-5 Trade Partnership project.

### **Potential to Maximize Revenues**

Funding is currently not available to build a new bridge across the Columbia River. Tolls are a viable option for generating the necessary revenues to build, operate, and maintain a new I-5 bridge. This study will help answer the question whether tolling can generate sufficient revenues to cover the costs. Tolling scenarios will need to include tolling the I-5 Columbia River crossing under various improvement concepts as well as tolling both the I-5 and I-205 crossings.

Tolling scenarios need to consider improvement options that both optimize the revenues and accommodate collection facilities. None of the concepts developed for the I-5 Trade Partnership considered siting for toll facilities on either I-5 or I-205 for the river crossing.

One of the critical elements in optimizing tolling revenues is the ability to provide collection facilities that capture the most users. Based on current practices, methods of collection include a wide variety of technologies ranging from manual attended tollbooths to high-speed electronic collection. Standard toll plaza footprints require extensive right-of-way to accommodate vehicle deceleration, queuing, toll collection, recovery, and acceleration.

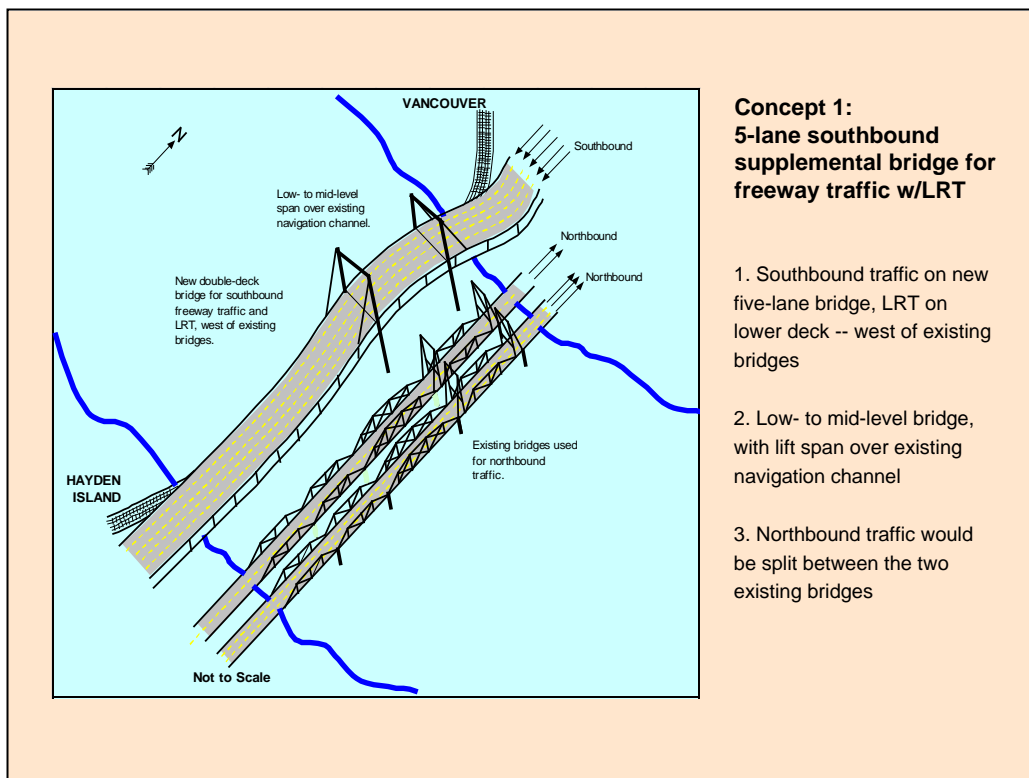
Another consideration for developing a range of tolling scenarios is whether to provide an option that collects tolls for users on new facilities only. Policy makers will argue that users should not be required to pay for use of facilities that are already in place and paid for. If the existing bridges are to remain, one option for consideration is to allow free use if they are to be used for arterial traffic only.

## Range of Concepts (Options) Studied in the I-5 Trade Partnership Project

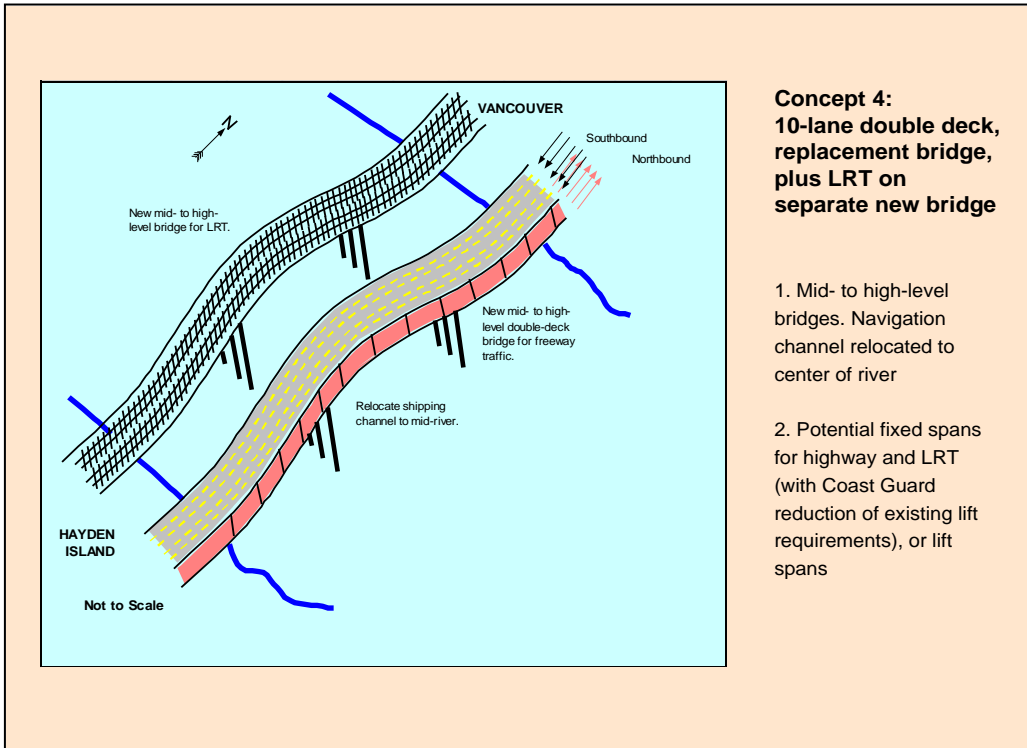
As part of the I-5 Trade Partnership project, four Columbia River crossing concepts were selected for detailed design and evaluation (Figures 1, 2, 3, and 4). Analysis of these concepts provided insight into issues of supplemental and replacement bridges, joint use (LRT-highway) and separate bridges, alignments east and west of existing bridges, freeway lanes and arterial lanes across the Columbia River, and a comparison between high-level, fixed-span bridges to low-level movable-span bridges.

These concepts were then tested for transportation performance, costs, property impacts, environmental concerns, and implementation issues. Designs were developed in sufficient detail to estimate right-of-way needs and their impacts to the adjacent land uses. However, the concepts were not tested for their ability to accommodate toll collection facilities.

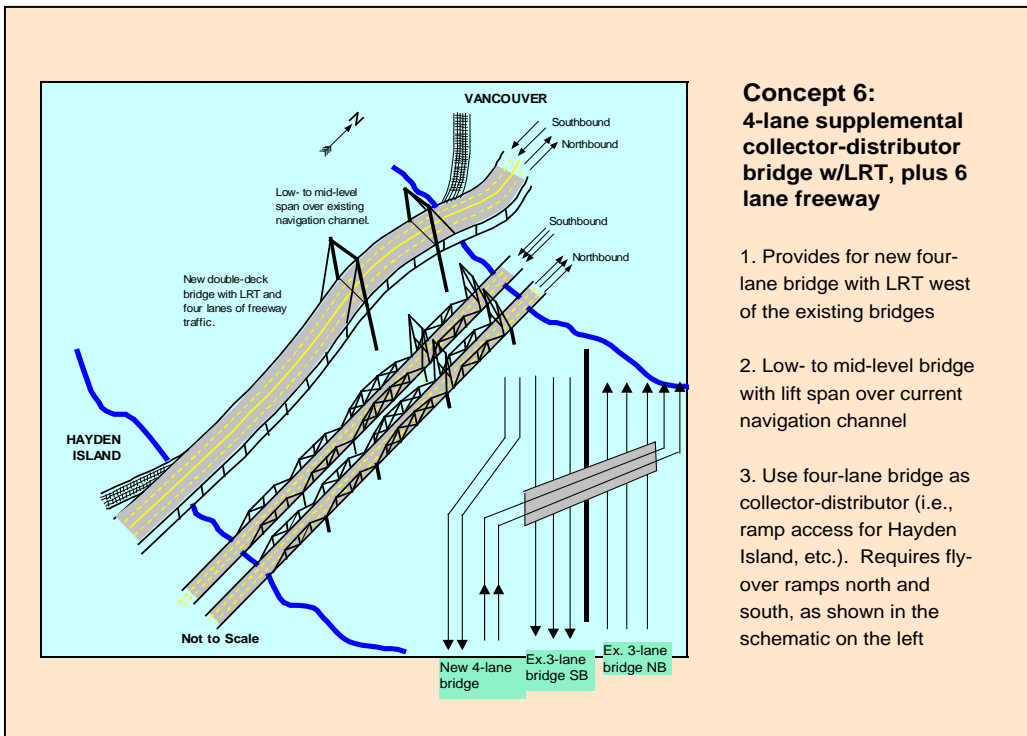
**Figure 1. Bridge Concept 1**



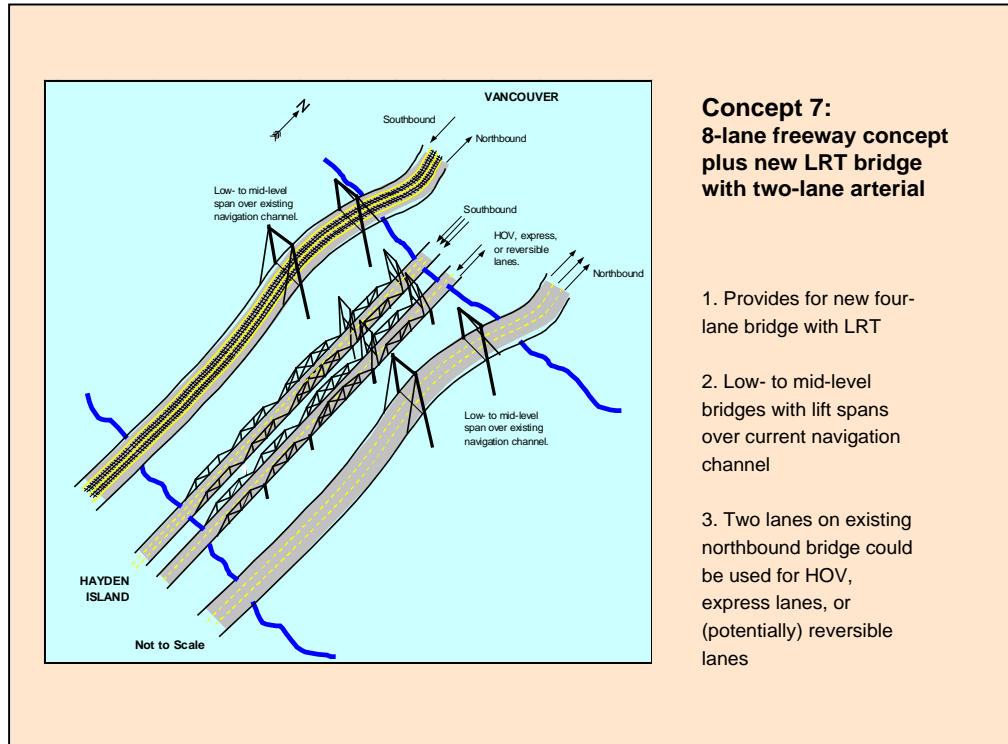
**Figure 2. Bridge Concept 4**



**Figure 3. Bridge Concept 6**



**Figure 4. Bridge Concept 7**



The Task Force that served as the decision-making forum for the I-5 Trade Partnership project did not adopt the four specific concepts as alternatives to be carried forward for evaluation in the EIS. Rather, they guided the development of the Strategic Plan for the corridor that incorporated broad recommendations that encompassed many of the concepts that were studied. Within the plan, recommendations were made for investments that would meet the needs for highways, transit and heavy rail, and recommendations for managing the transportation and land use systems to protect investments in the corridor.

The Final Strategic Plan for the I-5 Trade Partnership project included the following highway and transit concepts within their recommendations within the Bridge Influence Area (BIA) for further evaluation in an EIS:

1. Eight- or ten-lane freeway concepts;
2. Replacement or Supplemental Bridge;
3. Joint use or non-joint use Freeway/LRT Bridge;
4. Eight-lane freeway with joint LRT/2-lane arterial; and
5. HOV throughout the I-5 Corridor.

In addition, a six-lane freeway plus two two-lane arterials, one in the vicinity of the I-5 corridor and one in the vicinity of the railroad bridge, should be evaluated to determine whether it is a viable alternative for consideration in the EIS.

The following concepts were not recommended for consideration in an EIS:

1. Tunnel concepts;
2. Collector-Distributor bridge concepts; and
3. Arterial-only bridge concepts.

### **Recommended Range of Options for the Tolling Analysis**

Tolling scenarios, then, should optimize revenues within the improvement scenarios that are most likely to match with alternatives that will be developed in the EIS. Following are five recommended tolling scenarios:

1. Toll five lanes in one direction on I-5 similar to concepts 1 and 4. Toll collection facilities can be located in either Washington or Oregon, and can cover either northbound or southbound traffic.
2. Toll five lanes in one direction on I-5 and toll existing lanes similar to above, and toll I-205 in one direction. Toll collection facilities on I-205 will be directionally compatible with those on I-5. Toll collection facilities can be sited in either Washington or Oregon, and can cover either northbound or southbound traffic.
3. Toll four lanes in one direction on I-5. Toll collection facilities can be located in either Washington or Oregon, and can cover either northbound or southbound traffic.
4. Toll three lanes in one direction on I-5. Toll collection facilities can be located in either Washington or Oregon, and can cover either northbound or southbound traffic.

### **IS THERE A NEED FOR ADDITIONAL ENGINEERING WORK?**

This section addresses the extent of additional traffic analysis needed to refine or narrow alternatives without performing additional engineering work, and where targeted additional engineering detail must be done.

Four BIA concepts shown in Figures 1 through 4 were developed in sufficient detail to determine: transportation performance, costs, property impacts, environmental concerns, and implementation issues. Metro's travel demand forecasting models combined with a traffic simulation model were used to determine lane balance and access needs. Engineering concepts were developed sufficiently to test their feasibility and to generate footprints for impact evaluation and base quantities for the cost estimates.

Interchange improvements were applied to each of the four river crossing concepts on I-5 within the BIA. On the Washington side, the close proximity of the SR 14, Mill Plain Boulevard, Fourth Plain



Boulevard, and SR 500/39<sup>th</sup> Street interchange ramps were problematic. The existing interchange at approximately half-mile spacing does not meet current urban design criteria and creates safety problems due to the heavy volumes of entering and exiting traffic. Each of the improvement concepts employed bridges to separate high volume on and off movements. In addition, collector-distributor lanes were provided to reduce the number of freeway entrances and exits. Similar major freeway modifications were designed in Oregon. Designs were developed that minimized the impacts to adjacent land use and neighborhoods.

## **Tolling Scenarios Were Not Evaluated**

Tolling scenarios were not included in any of the traffic analyses and engineering for the four concepts. Integrating toll collection facilities into the alternatives that will be evaluated in an EIS will require additional traffic analyses, innovative engineering, and most likely will require new policies or regulations.

Traditional tolling collection methods used throughout the United States rely on a combination of electronic tolling methods and staffed tollbooths. Footprints for toll plazas on high traffic volume interstate facilities can be more than a mile in length because of the need to slow traffic entering the toll booths, then allowing sufficient space to accelerate back to freeway speeds. Width of the toll plaza footprint is based on the volume of traffic and number of tollbooths required for meeting peak period demand. When high speed ETC methods are used, barriers and shoulders are required to separate the fast moving traffic from vehicles slowing for the tollbooths, adding to the width of the plaza footprint.

Based on an initial evaluation for potential toll plaza sites on I-5 and I-205, there are no obvious locations that will accommodate standard facilities—additional engineering work will be required. Rather than investing in detailed analysis, additional engineering at this stage can most effectively be used to determine whether a feasible toll collection system can be provided. Fortunately, many of the designs developed for each of the interchanges are somewhat interchangeable between river crossing concepts.

Additional traffic analyses beyond that planned for in this study is not warranted to further develop engineering concepts. At a conceptual level, approximations developed through spreadsheet models proposed in the analysis of tolling scenarios can be used to determine whether various toll collection strategies are feasible.

There are not enough engineering hours budgeted in this study to provide more than a very conceptual range of costs and options for siting toll collection facilities. Detailed evaluation of toll collection scenarios should be planned for in the EIS.

## **Recommended Approach for Narrowing Alternatives**

If this study recommends tolling as a method of generating revenues, all of the improvement concepts will require additional traffic analysis and engineering work to refine and narrow alternatives. Improvement concepts that have been developed in the I-5 Trade Partnership project do not incorporate designs for toll collection facilities. Initial evaluation suggests that providing standard toll plazas will have extensive impacts to adjacent land uses.

As part of this study, further evaluation of potential toll collection methods is needed. The next step should be to hold a workshop on siting toll collection facilities to test whether toll collection methods can be developed for either I-5 or I-205. Participants should include experts in toll collection design as well as Interstate freeway design.

## **I-205 INFORMATION**

This section provides a brief evaluation of information available for the I-205 river crossing which was not included in the previous stage of the I-5 Trade Partnership. Included are recommendations for data and analysis for improvement requirements related to the I-205 tolling options.

Available and needed traffic data for I-205 was included in Working Paper 4.2 and Technical Memorandum 4.3. Tables 1, 2, and 3 in Working Paper 4.2 (replicated as Tables 4, 5, and 6 in Technical Memorandum 4.3) presented available as well as additional travel forecast information necessary to identify, evaluate, and screen tolling options and road/bridge improvement options in this current phase of study. Receipt of additional data that has been requested of Metro should meet the traffic data needs for assessing tolling scenarios.

### **I-205 in Washington**

A major improvement project is planned for I-205 in Washington between the Columbia River and SR 500. An Access Point Decision Report was prepared for the I-205 Strategic Corridor Pre-Design Study, dated February 2002. Improvements are proposed for implementation through a staged construction program. The City of Vancouver, Southwest Regional Transportation Council, and Washington State Department of Transportation are lead agencies. The City of Vancouver will be advertising for consultant services to prepare environmental documentation required for approval of the Access Point Decision Report in September, 2004 with the study to be completed over the next three years.

Major access revisions for I-205 are planned as follows:

- Modifications to the existing Mill Plain Boulevard, SR 500, SR 14/I-205 Interchanges
- New access from I-205 to NE 112<sup>th</sup> Avenue
- New access along I-205 between NE 18<sup>th</sup> Street and Burton Road
- Modifications to I-205 between SR 500 and NE 83<sup>rd</sup> Street (Padden Parkway)

Work required to prepare the Access Point Decision Report required extensive traffic analysis and development of engineering concepts. This information is available for evaluating tolling options within Washington State.

The proposed improvements to I-205 will have direct impacts on siting of standard toll plazas on the Washington State side due to the extensive ramp revisions that will occur between the SR 14/I-205 Interchange and the adjacent interchanges to the north.

## **I-205 in Oregon**

No improvement projects are eminent on the Oregon side that would impact siting of toll collection facilities. However, existing conditions with closely spaced interchanges at Airport Way and Sandy Boulevard create similar siting problems as in Oregon as in Washington state.

## **Recommended Actions for I-205 Analysis**

Siting of toll collection facilities will require additional engineering evaluation if recommended as an alternative to be carried forward for evaluation in an EIS. Sufficient information is available to include an evaluation of potential toll collection methods for I-205 in a workshop as recommended for narrowing of options.

## **SUMMARY**

- A review of the traffic analysis prepared for the I-5 Trade Partnership projects indicates that travel forecasts and data is sufficiently reliable to perform the level of tolling analysis for this phase of study. Metro has committed to provide supplemental data that is currently available to fill in the missing gaps for the tolling analyses.
- The following range of options should be used for the tolling analysis.
  1. Toll five lanes in one direction on I-5 similar to concepts 1 and 4. Toll collection facilities can be located in either Washington or Oregon, and can cover either northbound or southbound traffic.
  2. Toll five lanes in one direction on I-5 and toll existing lanes similar to above, and toll I-205 in one direction. Toll collection facilities on I-205 will be directionally compatible with those on I-5. Toll collection facilities can be sited in either Washington or Oregon, and can cover either northbound or southbound traffic.
  3. Toll four lanes in one direction on I-5. Toll collection facilities can be located in either Washington or Oregon, and can cover either northbound or southbound traffic.
  4. Toll three lanes in one direction on I-5. Toll collection facilities can be located in either Washington or Oregon, and can cover either northbound or southbound traffic.
- Integrating toll collection facilities into the alternatives that will be evaluated in an EIS will require additional traffic analyses, innovative engineering, and most likely will require new policies or regulations. Sufficient budget is available in this study to complete traffic analysis needed to evaluate tolling scenarios.
- There are not enough engineering hours budgeted in this study to provide more than a very conceptual range of costs and options for siting toll collection facilities. Detailed evaluation of toll collection scenarios should be planned for in the EIS.

- Sufficient information is available to include an evaluation of potential toll collection methods for I-205 at a very conceptual level. If carried forward as an alternative, detailed evaluation of toll collection scenarios should be planned for I-205 in the EIS.